

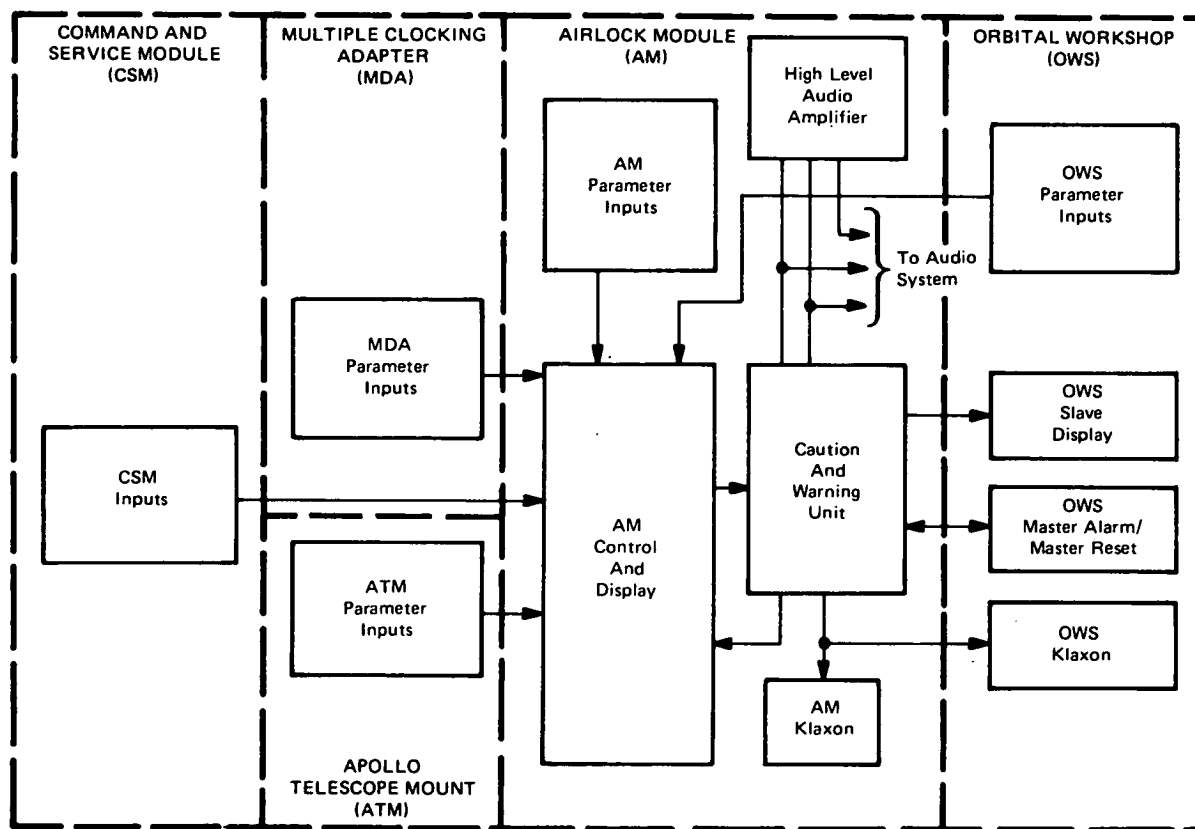
# NASA TECH BRIEF

## *Marshall Space Flight Center*



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### Airlock Caution and Warning System



A caution and warning system, used to monitor performance and warn of hazards or out-of-limit conditions on space vehicles, may have potential application to earth-bound vehicles, particularly aircraft and railway high-speed transit systems. The caution and warning system consists of two isolated independent subsystems, a caution and warning subsystem and an emergency subsystem. Major components of the system include sensors for monitoring system parameters, two signal conditioning packages and their associated power supplies, control and display panels, a caution and warning unit, a high-level audio amplifier, and two Klaxon

assemblies (see figure). The system has several novel features: a) A memory capability permits the initiation of a memory recall that identifies any caution and warning parameters that malfunctioned and subsequently returned to normal. b) Four distinct tones are used to identify caution, warning, emergency fire, or emergency pressure loss condition. c) For the first time in the manned spacecraft program, ultraviolet fire sensors are used as fire detection devices. d) A rapid pressure loss sensor detects a variation in pressure decay rates of  $12 \text{ N/m}^2$  per second (0.1 psi/min) or greater.

(continued overleaf)

Wherever practical, redundant sensors are used to eliminate the possibility of a single-point failure of a parameter. Sensors used by other systems are all isolated. Signal conditioning for the caution and warning subsystem is provided by two instrumentation signal conditioning packages that accept analog signals from specific sensors and provide discrete relay closures to the subunits of the system when a preselected trigger level value is reached. Each signal conditioning package has an associated power supply that is powered from a normally energized bus and is protected by an independent circuit breaker. Each signal conditioning package monitors the output of its own power supply and provides a relay closure to the caution and warning subunits when the output voltage of the power supply drops below a specified level.

The system is depicted in the diagram as it is used in a space vehicle.

#### Notes:

1. Information concerning this innovation may be of interest to the aircraft and railway industries.
2. Requests for further information may be directed to:  
Technology Utilization Officer  
Marshall Space Flight Center  
Code A&TS-TU  
Huntsville, Alabama 35812  
Reference: B72-10467

#### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

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